

## ABSTRACTS Selected from *Journal of Northeast Forestry University*(Chinese Edition)

**The Relationship of Permeability of Plasma Membrane and Salt Resistance of Woody Plants**/Yang Chunping(Northeast For. Univ., Harbin 150040), Jiao Xicai, Liu Wenxiang *et al*//J. Northeast For. Univ. -1997, 25(1) - 1-3

The permeability of plasma membrane and salt resistance of 16 conifers and broadleaf species (line) were studied under salt stress. The results showed that the permeability of plasma membrane is the ideal measure to study the salt resistance. Plasma membrane of the resistant species are difficult to be destroyed and the permeability is less than that of the sensitive species whose plasma membrane are seriously destroyed. The most resistant conifers species were *Pinus sylvestris*[1] var. *mongolica*, *Pinus armandi* Franch, *Pinus koraiensis*. *Abies nephrolepis* was moderate resistant to salt, and the resistance of *Larix* and *Picea asperata* were poor. The most resistant species in the broadleaf species were *Ulmus pumila*, *Fraxinus mandshurica*, followed by Heilin 3, Zhongsui (12 two lines of *Populus*) and *Tilia amurensis*, and the most sensitive species were 118, 798601(two lines of *Populus* and *Betula platyphylla*). The resistant difference among species provided material basis for choosing resistant species.

Key words: Woody plants; Salt stress; Resistance

**Age Distribution and Season Dynamics of Root Biochore Soil Nutrition of White Birch-Korean Pine Stand**/Bao Qing (Heilongjiang Forest Management Institute, Harbin 150040, China), Zheng Xiaoguang, Zheng Xueliang *et al*//J. Northeast For. Univ. -1997, 25(1) -56 ~ 58

In the young, mid-age and mature stands, on the same site group, 3-4 experimental plots in each stand were set up. The root biochore sampling of white birch and Korean pine was done in June, August and October. Sample organic matter, pH and other properties were tested and analyzed. In the white birch-Korean pine forest, the soil nutrients at white birch root and Korean pine root has mutual compensation. Acid-base mutual compensation and balance process presents at root biochore of the two species. In the age-distribution and dynamic process of root biochore soil, nutrients and pH value, mid-age tree or stand always act as a convertor connected young stand with mature stand.

Key words: Root biochore soil, Soil analysis, White birch, Stand age distribution, Season dynamics; Korean pine

**Biological Characteristics of *Dendrolimus superans* with One Generation in Two Years**/Tian Feng, Guo Shuping, Shen Guotao *et al* (Heilongjiang Research Institute of Forest Protection, Harbin 150040, P. R. China)//J. Northeast For. Univ. -1997, 25(1) -22 ~ 25

The biological characteristics of larch caterpillars *Dendrolimus superans* (Butler) who has one generation in two years was studied. This insect completes a life cycle across three years, about 730 days. About 10% of next generation complete a life cycle in one year, and all the insect with one-year life cycle could

enter two-year life cycle. The insects with two-year life cycle overwinter between slight Heat and the beginning of Autumn in next year. Adults and larvae take place alternatively between odd and even number year.

Key word: Two-year life cycle, *Dendrolimus superans*, Biology

**The Optimization of Tree Species Composition of Nature Dahurian Larch**/Zhang Shizeng, Li Binsheng (Heilongjiang Forest Management Institute, Harbin 150040, China), Cao Yutian *et al*//J. Northeast For. Univ. -1997, 25(1) -65 ~ 66

The volume and increment of larch stand in 127 experimental plots in Heihe District were systematically analyzed. The frequency analysis was also made on analyzed results and tree components. The research result indicated that, concerning tree species components, larch should be the dominant but it must not reach 100% for high-production stand. The basal area proportion of Dahurian larch should be controlled to 90%-95% on shady slope and to 85%-90% on sunny slope. The tree number proportion of larch should be controlled to 80%-92% on shade slope and to 80%-85% on sunny slope.

Key words: Dahurian larch, Species composition,

Volume, Increment

**The Division of Growth Stages and Aim-Classification Management of Nature Larch Stand**/Bao Qing (Heilongjiang Forest Management Institute, Harbin 150040, P. R. China), Zheng Xiaoguang, Wang Guangshan *et al*//Journal of Northeast Forestry University. -1997, 25(1) -12 ~ 24

The growth period of nature larch stand in Heihe district was divided into 5 stages with Fisher method based on 122 sample plots. The relation between the growth stages and aim-classification management was explored. In Heihe District, the sub-mature stage for the stand is 33-34 years and the age for volume mature is above 45. The sub-mature age of the larch stand on shady slope is 3-7 years longer than that on sunny slope, and the growth speed is much slower. For the difference in growth between shady slope and sunny slope, the author suggest that the sunny slope is suitable to develop the commercial forests with a short rotation and the shady slope is suitable to develop the long-rotation commercial forests.

Key words: Larch Growth period; Orientated management

**Analysis of Chemical Induced Products on the Host of Poplar Bacterial Canker**/Yang Mingfei, Pan Xuefeng, Li Chunjiang *et al*//J. Northeast For. Univ. -1997, 25(1) -67-71

In this paper, the contents of catechol, lignin and inorganic element-K in small poplar branches that induced by five kinds of inducer have been determined by DU-7 UV-VIS spectrophotometer and P-E 5000 atomic absorption spectrophotometer. The results show that inducer: phenylmercuric acetate, salicylic acid, heat-killed, *Erwinia herbicola* treated by ultrasonic vibration and its supernatant have a obvious accumulative effect on catechol, lignin and K thd host. It is important that increases resistance to fungus of poplar, then, it is not equal that contents of induced products of poplar branches that induced by different mutagen and concentration. The study supplies a evidence to understand

induction resistance mechanism of the host of poplar bacterial canker. It is more important that more substances and factors resist fungus synergistic action.

Key words: Poplar, Bacterial canker, Chemical inducement, Catechol, Lignin, Inorganic element

**Separation and Identification of Main Components of *Ledum* Oil**/Qiu Zhiguo, Yin Chengzeng, Guo Xuefei(Northeast For. Univ., Harbin 150040, China)//J. Northeast For. Univ.-1997, 25(1) .-41-44

The essential constituents of the oil from *Ledum palustre* L.Var. have been separated and identified by means of vacuum distillation, GC, IR, UV, catalytic hydrogenation and boil determination. Three major components with more content — myrcene, p-cymene and myrtenal were identified. Referring to the result of the GC and GC-MS at the same conditions, some compounds such as  $\alpha$ -pinene and comphene were identified. Their contents in *Ledum palustre* L.were also given.

Key words: Oil from *ledum palustre*, Separation, Gas chromatography, P-cymene, Myrcene, Myrtenal

**Evaluation on Ecological Benefit of Protective Forest Systems in a County Scale**/Gong Weiguang, Xiang Kaifu (Northeast For. Univ., Harbin 150040, P. R. China), Wang Mingzhong *et al*//J. Northeast For. Univ.-1997, 25(1) .-4-7

It is studied how to evaluate dynamically ecological benefit of protective forest systems in a county scale in this paper. Data of air temperature, air humidity, wind velocity, crop yield and forest cover percentage were investigated and collected in some of counties of Heilongjiang Province, where protective forest systems were established in the last 30 years. Through analysis, an evaluation index system to estimate ecological benefit of protective forest systems was set up, which consists of both vegetation index system and climate index system. The former includes a forest cover percentage index and a crop yield index; the later does three variable indexes, wind velocity, air temperature and air humidity. A comprehensive ecological benefit index was developed through analysis and calculation. Taking Zhaozhou County and Anda County as an example, the ecological benefits since establishment of protective forest systems of the two counties were evaluated dynamically using the index.

Key words: Protective forest system, Ecological benefit, Index,

**The Characteristic Structure of Resin Canals and Tapping of *Pinus Banksiana* Lamb**/Wang Jizhi, Wang Xiyan, Zhao Guodong (Forestry Research Institute of Jilin City, Jilin 132011)//J. Northeast For. Univ.-1997, 25(1) .-72-74

*Pinus banksiana* is one of the introduced quick-growth evergreen tree species in the Northern China. In this paper, based on the microscopic structure of resin canals of *Pinus banksiana* lamb, the reason that *Pinus banksiana* is not suitable for common tapping was described.

Key words: *Pinus banksiana*, Tapping; Resin canal

**Provenance Test of *Pinus Banksiana***/Zhang Ligong, Man Shuhua(Forestry Academy of Liaoning Province, Shenyang

110032, P. R. China), Jia Zhiyuan *et al*//J. Northeast For. Univ.-1997, 25(1) .-19-21

The Provenance testing on *Pinus banksiana* Lamb was conducted for seven years. The results show that there exists significant difference in tree height, breast diameter, and crown width among varied provenance. The trees' increment has a decrease with geographic latitude increase. The numbers of branch whorls show significant negative correlation with longitude, and the correlation between other characters and longitude and latitude are not significant. The best provenance is No1. and No.2 that come from the near areas of latitude 46 ° N, and the No.3 and No.5 come from latitude 50° N and 55° N respectively are the worst provenance.

Key words: *Pinus banksiana*, Provenance test, Geographic variation, Provenance selection

**The Method for Estimating Forest Volume by Remote Sensing and Regression of Practical Measurement**/Zhang Quijiang, Yuan Yadong, Cong Xiubao(3th Forest Inventory and Planning Institute of Heilongjiang Province, Harbin 150004, China)//J. Northeast For. Univ.-1997, 25(2).-18 ~ 23

This study is aimed at developing a new method for estimating forest volume. With double-regression sampling technique, the continue and quantitative measurements by the aerial-photograph-reading, with overall coverage of small scall and belt-photo of large scale, for stand were conducted. Combined with a small amount of practical measurement, the multiple regression analysis for forest volume was made. Finally, the effective estimation of forest volume in second-class forest resource inventory was completed. It can specified to a specific small area as stand block by this estimation method of forest volume, with the precision above 85% and reliability 95%. Comparing with other forest volume inventory method, this method can also save the cost of survey as it doesn't need large and heavy field investigation.

Key words: Remote sensing, Aerial photograph reading, Double regression sampling, Forest volume, Forest resources,

**The Precipitation Chemistry of the Moist Evergreen Broad-leaved Forest at the Ailao Mountain in Yunnan Province**/Gan Jianmin, Xue Jingyi, Xie Shouchang(Kunming Institute of Ecology, Chinese Academy of Sciences, Kunming 650223, China)// J. Northeast For. Univ. -1997, 25(1) .-8-11

The influences of chemical substance import of rainfall and rain dripping on organism substance circulation of forest ecosystem in Ailao Mountain of Yunnan Province were analyzed. The changes of rainfall, penetrative rain and stemflow were observed during May of 1991 to April of 1993, and the characteristics of corresponding water quality were measured. Concerning the nutrient import, rainfall and penetrative rain are both the main forms, but penetrative rain is much more important, while the amount of nutrient import by stemflow is too little to be mentioned. The amount of N, P, K, Ca, Mg imported by penetrative rain are 6.099, 0.423, 5.915, 1.789 and 0.771 kg  $\text{hm}^{-2} \cdot \text{a}^{-1}$  respectively, and by rainfall, that are 14.18, 0.123, 0.08, 1.429 and 0.183 kg  $\cdot \text{hm}^{-2} \cdot \text{a}^{-1}$ . Considering the concentration of N, P, K,

Ca, Mg, there exists a considerable difference among rainfall, throughfall and stemflow: stemflow > throughfall > rainfall. The concentration of these nutrients are arranged as  $N > K > Ca > Mg > P$  for penetrative rain,  $K > N > Ca > P > Mg$  for stemflow, and  $K > N > Ca > P > Mg$  for rainfall.

**Key words:** Moderate hilly moist evergreen broadleaved forest,

Ailao Mountain, Precipitation chemistry, Leaching

**Kinematics Analysis of Manipulator of Cone Collecting Robot in Rising**/Kong Qinghua, Ge Anhua, Lu Huaimin, Li Zhengyi (Northeast For. Univ., Harbin 150040, P. R. China)// J. Northeast For. Univ. -1997, 25(1) -45-48

The general structure of cone collecting robot mainly consists of manipulator, walking mechanism and computer control system. The kinematics of manipulator in rising process was analyzed and the kinematics rule of coordination movement between big and small arms was calculated. The results of calculation may provide a basis for design of hydraulic and computer control system.

**Key words:** Cone collecting, Robot, Kinematics analysis

**Cutting Propagation of *Picea koraiensis***/Zhao Lihui (Northeast For. Univ., Harbin 150040, China), Zhang Xingxiang, Peng Dongmei *et al*// J. Northeast For. Univ. -1997, 25(1) -15-18

With the outside automatic mist system, the softwood and hardwood cutting propagation of *Picea koraiensis* in different ages was conducted. The cuttings of *Picea koraiensis* presents significant effects of age and position. The cuttings from younger mother trees and the lower position of crown have higher rooting ability. Rooting rate of the cuttings reached 88.72%, or 31.9% higher than control, when based ends of softwood of 7 years old cuttings were soaked 3 h in aqueous solution of 100 mg/g rare-earth chemical compounds. The optimal transplanting time for the seedlings is in the middle of August and the number of roots is an important factor that affects survival rate of cuttings.

**Key words:** *Picea koraiensis*, Age effect, Position effect, Rooting rate, Cuttings

**The Control Techniques of Poplar Leaves Rust Disease**/Meng Fanrong, Ni Naihua, Li Ruxiu (Northeast For. Univ., Harbin 150040, China)// J. Northeast For. Univ. -1997, 25(1) -53-55

In recent four years, the leaves rust disease of *Populus simonii* × *P. nigra* seedlings in the area of Qiqihar Forestry Bureau has been effectively prevented and controlled by the combination of biological measures and chemical control method. The best combination of control measures is arranging seedling's spacing in 8 cm or 15 cm, cutting the lower leaves heavily or lightly, and spraying 25% triadimefon 1000 times. The average control effects was 36.64%. Loss rate of seedling was decreased by an average of 8.69%. The average increment rate of seedlings was 51.38%.

**Key words:** Poplar, Leaf rust disease, Control measures

**Development of Negative-Oxygen Chemical Fire Ignitor**/Chai Ruihai (Northeast For. Univ., Harbin 150040,

China), Yan Yuanting, Sun Juan// J. Northeast For. Univ. -1997, 25(1) -75-77

A negative oxygen chemical ignitor was developed for using in igniting fire line, backfire, prescribed fire in Northern China. The new type fire-igniting tool is made up igniting ball and ejector (like a pistol). The combustion temperature of igniting ball can reach 800 °C and ignited rate is above 98%. The effective range of the ejector is 60 m. This igniting tool is noted for fast igniting and save. Practical use showed that it can increase efficacy 2-3 times and cut down 50% cost in firing fire line.

**Key words:** Fire control, Igniting tool, Igniting ball ejector

**New Type Composite Structure Material-Scrimber Composite Particle Board**/Tang Xiaohua, Zhu Guoxi, Ma Yan *et al* (Northeast For. Univ., Harbin 150040, China)// J. Northeast For. Univ. -1997, 25(1) -62 ~ 64

The current products performance and problems of the scrimber, particle board and scrimber particle board were analyzed. Considering the state of production and management of artificial forests, It is pointed out that scrimber composite particle board will be one of the main particle board products. The new kind of board has the advantages of both scrimber and particle board, with merits on strength, production cost, suitability, processing availability and surface quality.

**Key words:** Scrimber, Particle board, Scrimber composite particle board, Composite material

**Measurement and Analysis of Large Compressive Deformation of Wood in the Transverse Direction**/Sun Liping (Northeast For. Univ., Harbin 150040, China), Wang Guirong, Wang Keqi *et al*// J. Northeast For. Univ. -1997, 25(2) -29-32

The samples of 11 species used in this study came from the Northeast forestry region. The tests of the large compressive deformation in the radial and tangential directions have been carried out under three conditions, the wet condition at 20 °C, wet condition at 100 °C and the air-dried condition at 20 °C. The digital collecting system is composed of the mechanical testing machine, mapper, A/D converter and computer. The data of deformation obtained in the tests of continuous compression were translated into the stress-strain data file. By statistical analysis the formulas of the large compressive deformation of wood in the transverse direction were obtained, which could quantitatively describe the stress-strain relationships under the various compressive conditions. The adaptability of the formulas were valid for various species used in this study under the most of conditions. The correlation coefficients were large than 0.99. The calculated values fit the experiment well. This study also compared the difference of the large compression deformation between the radial and tangential directions among the different kinds of structures (hard wood, soft wood, ring-pored wood, semi-diffuse-porous wood and diffuse-porous wood), and analyzed the effects of wood on the difference.

**Key words:** Computer data collection, Transverse direction,

Large compressive deformation, Stress-strain diagram

(Responsible Editor: Chai Ruihai)